

HINGE DEVICE FOR PORTABLE WIRELESS TERMINAL

This application claims priority to an application entitled "HINGE DEVICE FOR PORTABLE WIRELESS TERMINAL", filed in the Korean Industrial Property Office on Nov. 12, 2002 and assigned Serial No. 2002-70018, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a hinge device for a portable wireless terminal, and more particularly, to a hinge device for a portable wireless terminal such as a cellular phone or PDA (Personal Digital Assistant), and other similar devices.

2. Description of the Related Art

Conventional portable wireless terminals can be categorized according to their shape. For example, there are bar-type terminals, flip-type terminals, and folder-type terminals.

The bar-type mobile telephone terminal comprises a main housing, data inputs and outputs and transmitting and receiving modules installed on the main housing. In this case, since a keypad serving as data input means is always exposed to the outside, the keypad may be easily damaged, causing it to malfunction. Further, this type of terminal has a limit in its miniaturization due to the lengthy distance between the transmitting and receiving units.

The flip-type mobile telephone terminal comprises a main housing, a flip, and a hinge device for connecting the flip to the main housing. Data input and output devices and transmitting and receiving modules are installed on the main housing. In the flip-top terminal, the flip covers the main housing so as to protect a keypad serving as the data input means installed on the main body, thereby preventing damage to the keypad. However, the flip-type terminal still has a limit in its miniaturization due to the lengthy distance between the transmitting and receiving units.

The folder-type terminal comprises a main housing, a folder, and a hinge unit for rotatably connecting the folder to the main housing. The folder-type terminal is thereby opened and closed by the rotation of the folder. When a device utilizing the folder-type terminal housing is in standby mode, the folder is closed into the main housing of the folder-type terminal, to prevent damage to the keypad. When the device is in communications mode, the folder is opened from the main housing of the folder-type terminal, and a sufficient distance between the transmitting unit and the receiving unit is assured. Thus, the folder-type terminal has an advantage in terms of its miniaturization. As a result, portable wireless terminals have been mainly developed using the folder-type terminals.

In the flip-type or folder-type terminal, when the flip or the folder is rotated about the main housing more than a designated angle by the hinge device for rotatably connecting the flip or the folder to the main housing, force is applied to the hinge device so as to act in the direction of opening the flip or the folder from the main housing. Conversely, when the flip or the folder is rotated about the main housing less than the designated angle by the hinge device, force is applied to the hinge device so as to act in the direction of closing the flip or the folder into the main housing. Therefore, the flip or the folder is opened from, and closed into the main housing, even by a small amount of force.

The aforementioned hinge device is disclosed in detail by U.S. Pat. No. 6,292,980, issued to Yi et. al on Sep. 25, 2001, the entire contents of which are expressly incorporated herein by reference. The disclosed hinge device comprises a hinge cam and a hinge shaft which include mountain-shaped portions and valley-shaped portions respectively, and a hinge spring provided in a hinge housing to urge the hinge cam toward the hinge shaft. In this case, the folder or the flip is opened from and closed into the main body by curved surfaces of the mountain-shaped and valley-shaped portions and the elastic force of the hinge spring.

As mobile communication services have been recently diversified, the number of functions the terminal serves has correspondingly increased. For example, the terminal now serves as a portable terminal, a PDA, and a personal computer, which, along with other functions, are integrated in a single terminal. However, the conventional hinge device has only one function, namely rotatably opening and closing the flip or folder of the portable wireless terminal from and into the main body in the range of a designated angle. Thus, there are many limits in modifying the specification of the terminal in order to perform various mobile communication services. As a result, the conventional portable wireless terminal and hinge device do not satisfy the aforementioned various mobile communication services and customers' desires.

SUMMARY OF THE INVENTION

An object of the present invention is to substantially solve at least the above problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an object of the present invention is to provide a hinge device for a portable wireless terminal with a pair of housings in which a selected housing is connected to the other housing so as to be rotate about the other housing by about 360°.

It is another object of the present invention to provide a hinge device for a portable wireless terminal with a pair of housings in which a selected housing is connected to the other housing so as to stop its rotation at various angles with the other housing.

In accordance with one aspect of the present invention, the above and other objects can be substantially accomplished by a hinge device of a portable wireless terminal provided with a first housing and a second housing that is rotatably connected to the first housing. The hinge device comprises a double hinge arm, extending in the longitudinal direction of the first and second housings and being rotatably connected to one side of each of the first and second housings, a pair of hinge holes formed through one end of the double hinge arm, and at least one hinge module accommodated by each hinge hole so as to rotatably connect the double hinge arm respectively to the first and second housings.

In accordance with another aspect of the present invention, there is provided a hinge device of a portable wireless terminal with a first housing and a second housing that is rotatably connected to the first housing. The hinge device comprises a double hinge arm which includes a first hinge arm extending in the longitudinal direction of the first housing and being rotatably connected to the first housing, a second hinge arm being parallelly or substantially parallelly connected to the first hinge arm, extending in the longitudinal direction of the second housing and being rotatably connected to the second housing, and hinge holes respectively installed on one ends of the first and second